Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (cancelled)

2. (currently amended) A microfluidic system comprising:

a body structure comprising at least first, second and third substrate layers, the second substrate layer being disposed between the first and third substrate layers;

at least first and second ~~intersecting~~ microfluidic channels disposed in the second substrate layer, wherein the at least first and second channels intersect at an intersection;

at least a first port disposed through the first substrate layer, the at least first port being fluidly coupled to at least one of the first and second microfluidic channels;

a material transport system which is configured to ~~transport fluid-borne materials within at least the first and second microfluidic channels~~controllably direct material flow through the intersection; and

a detector disposed in sensory communication with a detection region associated with at least the first microfluidic channel which detector is configured to detect a detectable signal emitted from the ~~at least~~ first microfluidic channel.

3. (previously presented) The microfluidic system of claim 2, wherein said detection region comprises a detection window which is capable of transmitting a detectable signal emitted from the first microfluidic channel to the detector.

4. (previously presented) The microfluidic system of claim 2, further comprising at least a fourth substrate layer mated to the first or third substrate layer.

5. (previously presented) The microfluidic system of claim 2, wherein the at least first and second microfluidic channels have at least one cross-sectional dimension between about 0.1 and 200 microns.

6. (previously presented) The microfluidic system of claim 2, wherein the at least first and second microfluidic channels have at least one cross-sectional dimension between about 0.1 and 100 microns.

7. (previously presented) The microfluidic system of claim 2, wherein at least one of the first, second and third substrate layers is made from a polymeric material.

8. (previously presented) The microfluidic system of claim 2, wherein at least one of the first, second and third substrate layers is made from glass.

9. (previously presented) The microfluidic system of claim 2, wherein the first, second and third substrate layers are mated together with an adhesive.

10. (previously presented) The microfluidic system of claim 2, further comprising at least a second port disposed through both the second substrate layer and the first substrate layer and which is fluidly coupled to one of the first and second microfluidic channels.

11. (previously presented) The microfluidic system of claim 2, wherein the at least first port is disposed through the first substrate layer but not through the second substrate layer.

12. (previously presented) The microfluidic system of claim 2, wherein the at least first port is disposed through both the first and second substrate layers.

13. (previously presented) The microfluidic system of claim 2, further comprising a plurality of ports disposed through the first substrate layer.

14. (previously presented) The microfluidic system of claim 2, further comprising a plurality of ports disposed through the first substrate layer, at least one of the plurality of ports not being fluidly coupled to either the first or second microfluidic channels.

15. (previously presented) The microfluidic system of claim 2, wherein said material transport system comprises a pressure-based material transport system.

16. (previously presented) The microfluidic system of claim 2, wherein said material transport system comprises an electrokinetic material transport system.

17. (previously presented) The microfluidic system of claim 2, further comprising detection means associated with said body structure for detecting a detectable signal from the at least first microfluidic channel or for transmitting a detectable signal from the at least first microfluidic channel.

18. (previously presented) The microfluidic system of claim 17, wherein said detection means comprises at least one of the following located within sensory communication of

at least the first microfluidic channel: an optical sensor, an electrochemical sensor, a pressure sensor, and a pH sensor.